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14. ABSTRACT The nature of today's combat operations, coupled with the ascendancy of the Information Domain as the key ideological battleground, dictates U.S. force's shift from kinetic to non-kinetic means to achieve operational objectives. The current operating environment demands our forces to operate more jointly than in past operations, especially with regard to information operations (IO). Two sub-disciplines of IO, computer network attack (CNA) and electronic attack (EA), are often the means of choice to affect U.S. adversaries. With CNA and EA constantly evolving and being employed more often, it is appropriate to question: Does joint doctrine adequately support assessment of these means? A careful examination of pertinent joint doctrine reveals that on the whole, joint doctrine does provide enough guidance to support assessment at the operational level. Practitioners of CNA and EA have mixed views of the usefulness of joint doctrine, but it is still consulted as definitive guidance for the roles and responsibilities of assessment functions. What joint doctrine lacks is consistent guidance for assessment in IO sub-disciplines like CNA and EA. Adding and expanding material covering assessment concepts and challenges unique to CNA and EA will enhance significantly joint doctrine's usefulness to warfighters at the operational level of war.					
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**Assessing the Effects of Computer Network and Electronic Attack: Does Joint
Doctrine Measure Up?**

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**A paper submitted to the Faculty of the Naval War College in partial satisfaction of
the requirements of the Department of Joint Military Operations.**

**The contents of this paper reflect my own personal views and are not necessarily
endorsed by the Naval War College or the Department of the Navy.**

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Abstract

The nature of today's combat operations, coupled with the ascendancy of the Information Domain as the key ideological battleground, dictates U.S. force's shift from kinetic to non-kinetic means to achieve operational objectives. The current operating environment demands our forces to operate more jointly than in past operations, especially with regard to information operations (IO). Two sub-disciplines of IO, computer network attack (CNA) and electronic attack (EA), are often the means of choice to affect U.S. adversaries. With CNA and EA constantly evolving and being employed more often, it is appropriate to question: Does joint doctrine adequately support assessment of these means?

A careful examination of pertinent joint doctrine reveals that on the whole, joint doctrine does provide enough guidance to support assessment at the operational level. Practitioners of CNA and EA have mixed views of the usefulness of joint doctrine, but it is still consulted as definitive guidance for the roles and responsibilities of assessment functions.

What joint doctrine lacks is consistent guidance for assessment in IO sub-disciplines like CNA and EA. Adding and expanding material covering assessment concepts and challenges unique to CNA and EA will enhance significantly joint doctrine's usefulness to warfighters at the operational level of war.

Assessing the Effects of Computer Network and Electronic Attack: Does Joint Doctrine Measure Up?

The U.S. Secretary of Defense stated recently, “that over the long term, we cannot kill or capture our way to victory.”¹ With that in mind U.S. forces must rely more on non-kinetic and non-lethal means to achieve our operational objectives. Those non-kinetic means are most often part of information operations (IO) and the five sub-disciplines contained therein.² Computer Network Operations (CNO) and Electronic Warfare (EW) are two of those sub-disciplines that present unique challenges to the joint force commander (JFC) when it comes to assessing their effects against our adversaries.

Although EW is nothing new to U.S. forces, CNO is a relatively new means and its governing doctrine is still maturing. Assuming that CNO and EW will play a more prominent role in joint operations, the question must be asked: Does joint doctrine provide adequate guidance to assess the effects of CNO and EW?

U.S. adversaries effectively use cyberspace to promulgate their message; they use radio frequency (RF) communications and employ RF-triggered improvised explosive devices. While U.S. forces adapt to counter these adversary actions, joint doctrine must provide adequate guidance to meet the challenges of assessing the effects produced by Computer Network Operations (CNO) and Electronic Warfare (EW).

In response to the question above, this paper will demonstrate that joint doctrine does indeed measure up, and that it provides adequate guidance to assess CNO and EW effects. It will focus on joint doctrine that supports the operational level of

¹ Robert M. Gates, “The National Defense Strategy Striking the Right Balance,” *Joint Force Quarterly* 52, (January 2009): 3-7.

² Chairman, U.S. Joint Chiefs of Staff, *Information Operations*, Joint Publication (JP) 3-13 (Washington, DC: CJCS 13 February 2006), ix.

warfare, and determine the adequacy of that doctrine to support assessment of effects produced during CNO and EW operations. Joint doctrine that is absent or does not measure up could cause joint commanders operating independently of one another without a common understanding of the challenges they face, and without the foundational guidance on how best to meet CNO and EW challenges. Despite the best efforts towards unity of command, without effective doctrine to guide operations, unity of effort will suffer.

This paper will examine current joint doctrine and its relevance to the assessment process with an emphasis on doctrine pertaining to information operations, and in particular, computer network operations and electronic warfare. In order to thoroughly examine the aforementioned topic, several definitions are explained; assessment concepts and frameworks are also discussed. Joint doctrine such as that covering operations, targeting, plans, and intelligence disciplines will also be examined.

Joint doctrine should reflect best military practices that are proven through success, and to embody this concept the paper includes direct feedback from field operators, the work of leading defense academicians, and published thoughts from stakeholders in the IO community. By comparing current joint doctrine with feedback from personnel involved in recent operations it will become apparent if significant knowledge gaps exist and hopefully highlight areas for improvement. Feedback from operators involved in CNO and EW is vital as they cope with an ever-adapting enemy.

Foundational Definitions and Concepts

Computer network operations (CNO) and electronic warfare (EW) are two of five means that comprise information operations (IO).³ CNO is further divided into three sub-areas to include computer network attack (CNA), computer network defense (CND), and computer network exploitation (CNE).⁴ This paper will address CNA as the other two capabilities focus more on force protection and intelligence collection rather than the assessment of effects we are achieving on our adversary. Electronic warfare is divided into three areas: electronic attack (EA), electronic protection (EP), and electronic support (ES), and in terms of assessment this paper will focus on EA alone for the same reasons mentioned above.⁵

Perhaps individual service doctrine or tactics, techniques and procedures (TTP) provide enough guidance to conduct assessments, so the question becomes, “why joint doctrine? Joint doctrine “should provide the necessary and essential intellectual tools for the conduct of war by explaining the nature of war, setting standard definitions, explaining tactical or operational concepts, and providing tenets of how to fight.”⁶

In order to perform a comparative analysis of joint doctrine a number of terms and concepts must be defined. Assessment is defined as “a continuous process that measures the overall effectiveness of employing joint force capabilities during military

³ The three remaining components of IO are Military Deception (MILDEC), Psychological Operations (PSYOPS), and Operations Security (OPSEC).

⁴ Chairman, U.S. Joint Chiefs of Staff, *Information Operations*, Joint Publication (JP) 3-13 (Washington, DC: CJCS, 13 February 2006), I-7, fig. I-3.

⁵ Chairman, U.S. Joint Chiefs of Staff, *Electronic Warfare*, Joint Publication (JP) 3-13.1 (Washington, DC: CJCS, 25 January 2007), v.

⁶ Vego, Milan N., *Joint Operational Warfare Theory and Practice*, Naval War College, 20 September 2007, XII-3.

operations.”⁷ As the definition implies, assessment is conducted along the continuum of operational planning and execution. If the three levels of war are applied to the assessment function, the nature of that function changes.

Assessment of military operations at the strategic, operational, and tactical levels of war require different measures of effectiveness (MOE) and measures of performance (MOP) for each level.⁸ It follows that assessment focuses on strategic effects at the strategic level, and focuses on corresponding operational and tactical MOE at the operational and tactical levels of war. This structure ensures that assessment functions at all three levels of warfare do not duplicate effort and their products feed the next higher level, from tactical through strategic.⁹

Measures of effectiveness are used to gauge changes in target system behavior, usually based on that system’s pre-strike capability or preexisting condition.¹⁰ Measures of performance however are used to determine how well our forces are performing the task of affecting the adversary’s target systems.¹¹ Both MOE and MOP should be relevant, measurable, responsive to intended effects, and resourced to ensure adequate intelligence collection capability exists.¹²

Establishing MOEs and MOPs for CNA and EA presents unique challenges to those involved in operational planning and execution.¹³ Much of U.S. intelligence

⁷ Chairman, U.S. Joint Chiefs of Staff, *Joint Operations*, change 1, Joint Publication (JP) 3-0 (Washington, DC: CJCS, 17 September 2006), GL-6.

⁸ Chairman, U.S. Joint Chiefs of Staff, *Joint Targeting*, Joint Publication (JP) 3-60 (Washington, DC: CJCS, 13 April 2007), C-3.

⁹ Chairman, U.S. Joint Chiefs of Staff, *Joint Operations*, change 1, Joint Publication (JP) 3-0 (Washington, DC: CJCS, 17 September 2006), IV-31.

¹⁰ *Ibid.*, IV-33.

¹¹ *Ibid.*

¹² *Ibid.*, IV-34.

¹³ Chairman, U.S. Joint Chiefs of Staff, *Information Operations*, Joint Publication (JP) 3-13 (Washington, DC: CJCS, 13 February 2006), V-7-V-9.

collection and analysis is based on visual feedback, and this is due in large part to the obvious and measurable effects that kinetic weapons create. Absent a very effective military deception program, it is difficult for an adversary to hide the fact that military forces were destroyed or that a building was leveled. With regard to EA, an adversary can simply shut down a surface-to-air missile tracking radar when threatened, and while that effect is desirable it cannot be determined if that action was a result of EA or simply the adversary's standard operating procedure. Physical destruction of a target via kinetic means leaves no such ambiguity.

Assessment also occupies a key position in the joint targeting cycle; the sixth and last step of the cycle that helps "to determine the qualitative and quantitative results of fire efforts."¹⁴ The assessment phase, although last, is key to informing the joint force commander (JFC) of progress towards meeting the objectives.¹⁵ Within the targeting function, assessment most often refers to combat assessment, which is a compilation of multiple tactical actions and the effects that they produce.¹⁶ Combat assessment is further broken down into three complimentary elements; battle damage assessment (BDA), munitions effectiveness assessment (MEA), and reattack recommendation (RR).¹⁷

There are no doctrinally equivalent BDA or MEA terms for CNA and EA.¹⁸ It is accepted by the joint targeting community that the temporal, non-permanent effects characteristics produced by CNA and EA may not cause physical damage nor employ

¹⁴ Chairman, U.S. Joint Chiefs of Staff, *Joint Targeting*, Joint Publication (JP) 3-60 (Washington, DC: CJCS, 13 April 2007), II-2.

¹⁵ The Joint Targeting Cycle is composed of six steps: end state and commander's objectives; target development and prioritization; capabilities analysis; commander's decision and force assignment; mission planning and force execution; and assessment. Joint Publication (JP) 3-60, *Joint Targeting*, p II-2 – II-3.

¹⁶ Chairman, U.S. Joint Chiefs of Staff, *Joint Targeting*, Joint Publication (JP) 3-60 (Washington, DC: CJCS, 13 April 2007), C-4.

¹⁷ Ibid.

¹⁸ Ibid., C-1 – C-8.

munitions, but effects are assessed nonetheless, and means (tools or techniques) are evaluated for effectiveness.

Battle damage assessment can help satisfy information required for MOEs by providing post-strike data, whereas MEA is more closely linked to MOPs by answering the question, “am I doing things right using the correct means?”¹⁹ Providing MOEs and MOPs are designed correctly, the BDA organization is staffed and trained, and adequate intelligence collection is planned for and conducted, a commander can have confidence that the assessment process will inform him of the operation’s progress towards its objectives. While BDA is dependent largely on post-strike geospatial intelligence (GEOINT), other intelligence sources and disciplines add significantly to a more accurate assessment.²⁰ It is here where all-source intelligence is combined with operations reports to assess if the joint force is meeting operational objectives.

Joint Targeting and Assessment

When considering assessment, the joint targeting function continues to be the nexus between joint operations and joint intelligence functions. Although planning and intelligence functions necessitate their own joint doctrine and various assessments are conducted throughout planning and execution of joint operations, the joint targeting community continues to “own” the assessment piece as Appendix C, to Joint Publication 3-60, *Joint Targeting*.²¹ Within the joint targeting cycle and in order to be effective, the assessment process relies on MOEs that can be satisfied with known intelligence collection means. While those MOEs are established during the mission analysis phase,

¹⁹ Chairman, U.S. Joint Chiefs of Staff, *Joint Targeting*, Joint Publication (JP) 3-60 (Washington, DC: CJCS, 13 April 2007), C-3.

²⁰ Ibid, C-5.

²¹ Ibid., appendix C.

it is essential that they be periodically revisited to ensure they allow for target system change as well as unanticipated effects.²² In the case of CNA and EA, targets which those particular non-kinetic means are used against are by their nature more difficult to collect against. A computer network or radio frequency communications system can be more readily modified and adapted than a static petroleum, oil and lubricant (POL) facility.

In terms of targeting, the aforementioned POL facility represents what is commonly known as a “tame problem” and retains the characteristics of a quantifiable output, easily identified components, elements and purpose, and not prone to rapid adaptation or modification.²³ Even if it were possible to affect a POL facility’s output with non-kinetic means, the effects could still be measured by conventional intelligence, surveillance and reconnaissance (ISR) methods. This is an example of a traditional target where its role in the overall POL system can be assessed and the effects of its disruption can be attributed to some sort of operational degradation.²⁴

The real challenge is attempting to target a system that is adaptable, not easily collected against, agile in response to threats, and linked to a variety of other systems that we either do not understand or cannot gain access to.²⁵ Adversary propaganda or will to fight promulgated over a computer network often falls into this category, and in terms of

²² Chairman, U.S. Joint Chiefs of Staff, *Joint Operations*, incorporating change 1, Joint Publication (JP) 3-0 (Washington, DC: CJCS, 17 September 2006), IV-30.

²³ Jeremy Blackham, “Dealing With ‘Wicked Problems’”, *RUSI Journal*, vol. 152 issue 4 (August 2007): 1. U.S. Army, *Commander’s Appreciation and Campaign Design*, TRADOC Pamphlet 525-5-500 (Fort Monroe, VA: Headquarters U.S. Army Training and Doctrine Command, 28 January 2008), 9.

²⁴ Chairman, U.S. Joint Chiefs of Staff, *Joint Targeting*, Joint Publication (JP) 3-60 (Washington, DC: CJCS, 13 April 2007), C-4.

²⁵ Roger W. Barnett, *Information Operations: Access, targeting, and Assessment*, Strategic Research Department Research Report (Newport, RI: Naval War College Press, February 2000), 12-17.

understanding their complexity represent “wicked problems”.²⁶ Using will to fight as a targeting example, it is evident there are no time-proven TTPs or statistical tables that allow accuracy when targeting the problem, and even if there were, they would involve a “whole of government” effort that is largely dependent on political will.²⁷ CNA targets such as these – the information networks carrying the message – are almost always viewed at the operational level of war (or higher) commensurate with the potential effect produced by degradation or disruption.

Assessment functions currently defined by joint doctrine focus at the operational level and expect to encounter tame problems based on myriad lessons learned, joint/service TTP, and the overall conduct of the operation.²⁸ Dealing with tame problems is what the joint force is most comfortable with and what joint doctrine reflects. This is not illogical because as commonly defined, wicked problems do not repeat, so it cannot be known if or when they will occur or what characteristics they will have.²⁹ Joint doctrine cannot incorporate rapidly material that is still grappled with.

Despite the role of joint doctrine in providing proven guidance based on operational analysis, it is often considered faulty and not forward thinking enough.³⁰ In addition to joint doctrine, commander’s handbooks have flourished in an attempt to provide informal but more detailed guidance for joint operations. The *Commander’s Handbook for Joint Battle Damage Assessment*, U.S. Joint Forces Command, Joint

²⁶ Horst W. J. Rittel, “On the Planning Crisis: Systems Analysis of the ‘First and Second Generations’”, *Bedriftsokonomien* 8(1972), 392-393, quoted in U.S. Army, *Commander’s Appreciation and Campaign Design*, TRADOC Pamphlet 525-5-500 (Fort Monroe, VA: Headquarters U.S. Army Training and Doctrine Command, 28 January 2008), 9.

²⁷ Jeremy Blackham, “Dealing With ‘Wicked Problems’”, *RUSI Journal*, vol. 152 issue 4 (August 2007): 1. Timothy L. Thomas, “Countering Internet Extremism”, *IO Sphere*, winter 2009 (XX ABC 2009): 14, 19.

²⁸ Jeremy Blackham, “Dealing With ‘Wicked Problems’”, *RUSI Journal*, vol. 152 issue 4 (August 2007): 1.

²⁹ *Ibid.*, 2.

³⁰ David H. Gurney, “Trouble with Doctrine”, *Joint Force Quarterly*, issue 53 2nd quarter (April 2009): 59.

Warfighting Center, was viewed as a more responsive product than the existing JPs, and provided greater detail on a narrower subject.³¹ The publication incorporated lessons learned from Operations ALLIED FORCE and ENDURING FREEDOM, and pre- and post-strike imagery, sample BDA messages and served as a “how to” guide for commanders.³² This is one example of a direction where some have thought joint doctrine should go, but unfortunately the handbook is focused almost exclusively on kinetic targeting and the tactical level of war. Its utility to enhance CNA or EA assessment efforts is very limited.

Other commander’s handbooks did not fare as well; they were not based on time-proven theories and lacked applicability across the range of military operations. The *Commander’s Handbook for an Effects-Based Approach to Joint Operations*, U.S. Joint Forces Command, represented a supposed evolution of joint targeting TTP from tame, closed target systems discussed earlier in this paper and attempted to apply an untried methodology that sought to quantify complex human behaviors.³³ The authors collectively sought to have effects-based theory included wholesale into joint doctrine but that effort was not realized. The effects created by CNA and EA are challenging enough to assess without subjecting practitioners to a new lexicon, organizational structures and assessment schemas.³⁴ This example further validates the need for combat-proven joint doctrine and its relative value in the face of unproven theories.

³¹ U.S. Joint Forces Command, *Commander’s Handbook for Joint Battle Damage Assessment*, (Suffolk, VA: Joint Warfighting Center. 1 June 2004).

³² Ibid., various pages and throughout text.

³³ James N. Mattis, “USJFCOM Commander’s Guidance for Effects-based Operations”, *Joint Forces Quarterly*, issue 51 4th quarter (October 2008): 105-108.

³⁴ U.S. Joint Forces Command, *Commander’s Handbook for an Effects-Based Approach to Joint Operations*, (Suffolk, VA: Joint Warfighting Center. 24 February 2006), IV-11 – IV-18.

Doctrinal Strengths and Weaknesses

Several joint publications discuss the concept of assessment and the different assessment functions within joint intelligence, operations, and plans organizations. The primary volumes are JP 2-0, *Joint Intelligence*, JP 3-0, *Joint Operations*, and JP 5-0, *Joint Operation Planning*, but each of these refers back to JP 3-60, *Joint Targeting*, as the primary doctrinal source for how to conduct assessments.³⁵ Each of the first three volumes contains the same basic information on assessment as JP 3-60, *Joint Targeting*, and yet there is no additional authoritative guidance presented for operational-level assessment functions.

Two other volumes of particular interest are JP 3-13, *Information Operations*, and JP 3-13.1, *Electronic Warfare*.³⁶ JP 3-13 identifies joint intelligence functions as supporting the creation of IO assessment criteria, and several examples are given in chapter five of that publication.³⁷ The main focus here is not on assessment but rather on the creation of effective MOEs and MOPs. This is certainly a critical step in the assessment process, but the document falls short with regard to assessment by offering a short paragraph discussing, “Challenges and Considerations” involved with assessing the effects of IO.³⁸ Additionally, the document identifies key functions of the IO staff; one

³⁵ Chairman, U.S. Joint Chiefs of Staff, *Joint Intelligence*, Joint Publication (JP) 2-0 (Washington, DC: CJCS, 22 June 2007), IV-19-24. Chairman, U.S. Joint Chiefs of Staff, *Joint Operations*, incorporating change 1, Joint Publication (JP) 3-0 (Washington, DC: CJCS, 17 September 2006), IV-30-34. Chairman, U.S. Joint Chiefs of Staff, *Joint Targeting*, Joint Publication (JP) 3-60 (Washington, DC: CJCS, 13 April 2007), appendix C. Chairman, U.S. Joint Chiefs of Staff, *Joint Operation Planning*, Joint Publication (JP) 5-0 (Washington, DC: CJCS, 26 December 2006), III-57-63.

³⁶ Chairman, U.S. Joint Chiefs of Staff, *Information Operations*, Joint Publication (JP) 3-13 (Washington, DC: CJCS, 13 February 2006), III-3-5, V-3-10. Chairman, U.S. Joint Chiefs of Staff, *Electronic Warfare*, Joint Publication (JP) 3-13.1 (Washington, DC: CJCS, 25 January 2007).

³⁷ Chairman, U.S. Joint Chiefs of Staff, *Information Operations*, Joint Publication (JP) 3-13 (Washington, DC: CJCS, 13 February 2006), V-3-10.

³⁸ *Ibid.*, V-10.

of which is to create and update target folders (for IO targets). No authoritative guidance is provided nor is a reference to another other joint publication given for clarification.³⁹

A key stakeholder in the IO community also shares this assessment. The Joint Force Component Command for Network Warfare (JFCC-NW), Deputy Chief of Targets (J2T), indicated during a recent survey that JP 3-13 was not helpful in the conduct of CNA assessment, and that the information on MOE/MOP was essentially the same as in other JPs.⁴⁰ JFCC-NW/J2T also indicated that JP 3-60, appendix C, *Assessment*, contains enough information that when coupled with operational experience, assessment of CNA can be accomplished effectively.⁴¹

Joint Publication 3-13.1, *Electronic Warfare*, is essentially void of information regarding assessment of the effects produced during EA operations.⁴² This publication does address briefly the development of MOEs and MOPs during the joint planning mission analysis phase, but stops short of the actual execution phase and does not at all address effects assessment.⁴³ This is likely due in part to the historical supporting role that EA performed in joint operations, rather than the lead role EA plays in current operations. In the past EA was planned, executed and assessed at the tactical level; in Operation IRAQI FREEDOM, EA is conducted primarily at the operational level.⁴⁴

Feedback from those serving in current operations bears this assessment out. A response to the author's survey by a former operations officer, Multi-National Corps –

³⁹ Chairman, U.S. Joint Chiefs of Staff, *Information Operations*, Joint Publication (JP) 3-13 (Washington, DC: CJCS, 13 February 2006), V-6.

⁴⁰ JFCC-NW J2T, e-mail message in response to author's survey, 17 April 2009.

⁴¹ JFCC-NW J2T, e-mail message in response to author's survey, 17 April 2009.

⁴² Chairman, U.S. Joint Chiefs of Staff, *Electronic Warfare*, Joint Publication (JP) 3-13.1 (Washington, DC: CJCS, 25 January 2007).

⁴³ *Ibid.*, III-9.

⁴⁴ Kalohi R. Clark, LCDR, former operations officer, Multi-National Corps – Iraq (MNC-I), Electronic Warfare Coordination Center (EWCC), e-mail message in response to author's survey, 23 April 2009.

Iraq (MNC-I), Electronic Warfare Coordination Center (EWCC), revealed that while useful for organizing and planning EA functions, JP 3-13.1 provides little information to help execute EA operations or conduct EA effects assessment.⁴⁵

Other organizations such as the Joint Information Operations Warfare Center (JIOWC), Joint Electronic Warfare Cell (JEWCC), requested assistance from CJCS J2, Deputy Directorate for Target Support (J2T), to create essential elements of information (EEI) for EA target folders.⁴⁶ This initiative is in response to a lack of specificity in the JP 3-13.1, and the absence of joint standards for operational EA target materials. Knowing (or not knowing) all the parameters of a particular target directly affects post-EA assessment efforts. It is difficult to know what to assess if one is not sure of the range of potential effects one can create.

Conclusion

The underlying premise of this paper is that joint doctrine is adequate to support the assessment of effects resulting from CNA and EA. It is clear that the joint publications that support CNA and EA do not alone contain enough information to support assessment functions.⁴⁷ However, when complimented by other joint doctrine for intelligence, operations and planning functions, and with subject matter expert-level knowledge of CNA or EA, information in the overall joint publication system is adequate to support effective assessments. Unfortunately not everyone is an expert and most of the joint force is not familiar with the range of joint doctrine. While adequate, there is much

⁴⁵ Kalohi R. Clark, LCDR, former operations officer, Multi-National Corps – Iraq (MNC-I), Electronic Warfare Coordination Center (EWCC), e-mail message in response to author's survey, 23 April 2009.

⁴⁶ Gregory J. Kula, CJCS J2T Target Issues Working Group (TIWG) project officer, summarization of group minutes, November 2007 – July 2008.

⁴⁷ JP 3-13, *Information Operations*, and JP 3-13.1, *Electronic Warfare*.

that can be improved and expanded upon to optimize joint doctrine's support to CNA and EA assessment and its overall contribution to the operational level of warfare.

Charting a Course Ahead

Joint doctrine is subject to a periodic review process like most other Department of Defense publications, and although incorporating new material and updating existing content is a laborious staffing process, it can and should be done. Based on the analysis and conclusions discussed previously, the following recommendations should be considered to improve joint doctrine's support of CNA and EA assessment activities.

In JP 3-13, the reference to target folders needs to be expanded upon.⁴⁸ JP 3-60 should be referenced, specifically appendix C, "Assessment", and a conceptual design for a target folder that incorporates essential elements of information (EEIs) pertaining to CNA be added as an appendix. This change will drive the reader to become familiar with the joint targeting cycle contained in JP 3-60.⁴⁹ Providing more detailed CNA EEIs will help planners create a comprehensive yet standardized product for use in CNA at any level of warfare. Essential elements of information (targeting) drive intelligence collection and analysis that completes target folders. This is accomplished during the mission analysis phase, but also provides a catalyst to cue up what collection requirements are needed to make accurate assessments after CNA.

As with JP 3-13, JP 3-13.1 would benefit significantly with appropriate references to JP 3-60, to include the joint targeting cycle, expanded content discussing MOE/MOP creation, and when eventually published, an appendix detailing the common EEIs for EA

⁴⁸ Chairman, U.S. Joint Chiefs of Staff, *Information Operations*, Joint Publication (JP) 3-13 (Washington, DC: CJCS, 13 February 2006), V-10.

⁴⁹ Chairman, U.S. Joint Chiefs of Staff, *Joint Targeting*, Joint Publication (JP) 3-60, (Washington, DC: CJCS, 13 April 2007), II-2-3.

target folders.⁵⁰ The results of this initiative will assist joint EA planners with a common joint planning format, and more specific intelligence requirements that will in-turn drive post-EA collection and reporting efforts.

In addition to the above recommendations, both JP 3-13 and 3-13.1 would benefit from expanded content relating to the unique challenges of assessing the effects of their respective means. Both publications refer to the unique challenges each discipline faces in *planning* operations, but there is no guidance that closes the loop from planning, to execution, to assessment, which then feeds back into planning.⁵¹ Joint doctrine is the correct venue for this information providing it remains applicable across the range of military operations and has been proven in operational warfare.

Closing Comments

A careful examination of joint doctrine, coupled with feedback gleaned from ongoing operations, reveals that despite some correctable deficiencies, joint doctrine is adequate to support the assessment of CNA and EA effects. There is, however, no “one-stop shopping” joint publication that provides enough information with regard to assessment of CNA and EA effects. Joint forces today are required to become familiar with several volumes of joint doctrine and are left to piece together guidance from seemingly unrelated publications.

JP 3-13, *Information Operations*, provides clear guidance on establishing MOEs and MOPs – the foundation for assessing effects – but fails to follow through and include

⁵⁰ EEIs for EW electronic target folders will be contained in an enclosure to DIA Instruction 3000.002, “U.S. / Allied Target Analysis Program (US/ATAP)”. The draft enclosure is the subject of biannual working groups and once approved by JIOWC/JEWC it will be submitted to Chief of Staff, DIA, for inclusion.

⁵¹ Chairman, U.S. Joint Chiefs of Staff, *Joint Targeting*, Joint Publication (JP) 3-60, (Washington, DC: CJCS, 13 April 2007), II-3.

assessment challenges and concepts.⁵² Based on content from the current publication it appears that U.S. forces are predominantly concerned with planning and executing IO, rather than closing the operational loop and informing the commander through an accurate assessment. Expanding the content of JP 3-13 to include a thorough discussion of the assessment process would increase significantly its utility to operational planners and collectors.

JP 3-13.1, *Electronic Warfare*, suffers from an almost total neglect of the assessment process, and should at minimum refer to JP 3-60, *Joint Targeting*, and if nothing else include guidance on establishing suitable MOEs and MOPs for EA.⁵³ The EW community has undertaken an effort outside of joint doctrine to develop standard EEIs for EA and this effort should provide both an example and a catalyst to update JP 3-13.1 as well.

Joint doctrine for conducting assessment of CNA and EA remains relevant in today's operations, even though the means to achieve those operational objectives outpaces the ability to keep doctrine current. Fortunately, doctrine's usefulness is grounded in proven concepts and guidance that is applicable across the spectrum of joint operations.

⁵² Chairman, U.S. Joint Chiefs of Staff, *Information Operations*, Joint Publication (JP) 3-13 (Washington, DC: CJCS, 13 February 2006), V-7 – V-10.

⁵³ Chairman, U.S. Joint Chiefs of Staff, *Information Operations*, Joint Publication (JP) 3-13 (Washington, DC: CJCS, 13 February 2006), V-7 – V-10.

Appendix A

1. If applicable, does your office/organization rely on Joint Publications (3-60, 3-13, 3-13.1 or others?) to help plan and conduct assessment of Computer Network Attack (CNA) and Electronic Attack (EA)?
2. JP 3-60, Appendix C, "The Assessment Process"; does this JP provide enough specificity to allow an organization to plan and conduct assessment (CNA and EA specifically)?
3. In your opinion, how useful is JP 3-13, "Information Operations" for planning and conducting assessment of CNA?
4. In your opinion, how useful is JP 3-13.1, "Electronic Warfare" for planning and conducting assessment of EA?
5. Does your office/organization include Service TTPs or Doctrine as references when planning and conducting assessment of CNA and/or EA? If so, which Service publications are most useful?

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